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AUTHOR Riley, Pamela M., Comp.
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ABSTRACT

The material included in this annotated bibliography has been arranged in several categories: general references to cloze procedure; methodology and rationale of cloze; cloze as a measure of readability, including cloze as a criterion to establish readability levels and as a predictor of achievement; cloze as a teaching technique; cloze in English as a second language; cloze in languages other than English; and other studies. The section on cloze and English as a second language includes research that has been completed in Australia, the Pacific, and Asia, as well as in the United States. Also included in this bibliography are studies with handicapped subjects. (WR)

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The Cloze Procedure — a Selected Annotated Bibliography.

Compiled

by

Pamela M. Riley.

P.N.G. University of Technology, Lae.

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INTRODUCTION

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Since 1953, when Wilson Taylor's article "Cloze Procedure; a New Tool for Measuring Readability" appeared in the *Journalism Quarterly*, aspects of cloze procedure have been the topic of numerous investigations.

Cloze procedure is a method of deleting words from a prose selection and evaluating the responses a reader makes as he supplies the words deleted. From the reader's score on the passage both the readability or reading difficulty of the passage and the reading achievement of the subject can be assessed. Words to be deleted (cloze items) may be at random or by a mechanical every Nth procedure, (standard cloze), or according to criteria such as word class, redundancy or predictability.

The validity and reliability of both standard and modified cloze as measures of readability and measures of general reading comprehension have been established in numerous research papers with subjects of different ages, and of different educational levels. The methodology of cloze constructions, length of the passage, number and type of deletions, length of the blank and use of pre-reading and post-reading cloze have been investigated at various levels. Scoring systems, giving credit for exact words only, and giving whole or partial credit for synonyms, words of the same grammatical class as the deletion, and acceptable alternatives have also been investigated. Cloze procedure has been used as an instructional technique in classrooms at levels from grade one to college, in listening comprehension, and in second or foreign languages as well as in English.

Bibliographies and reviews of research are available to give overall views of the rationale and application of cloze at various levels and in various areas. Publications and theses which are reviewed in bibliographies presently available have been omitted from this publication, as information on them is readily available. They are listed in the bibliography.

This bibliography aims to provide a reference to some of the publications that have become available since Jongsma's and Robinson's bibliographies of 1971 and 1972. Articles and theses have been selected because of their contribution to research, their implications for classroom practice, and the possibilities for related research which they present.

The material included has been arranged into several categories; general references to cloze procedure, methodology and rationale of cloze, cloze as a measure of readability, including cloze as a criterion to establish readability levels and cloze as a predictor of achievement, cloze as a teaching technique, cloze in English as a second language, cloze in ianguages other than English, and other studies. The section on cloze and English as a foreign language is detailed, as recently there has been research in Australasia, the Pacific and Asia as well as in the United States in this field, and cloze procedure promises to be a useful technique for teaching as well as measuring achievement across languages. Studies which are interesting and add to the general body of research are included in the final section, cloze and other studies. Studies with handicapped subjects which are relevant to the normal subjects and useful for teaching are included in this section.

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General Reference to Cloze Procedure

Reviews of research into cloze by Bickley, Greene, Hafner, Potter, Rankin, Taylor, Weaver and Weintraub have been included in Robinson's bibliography. The articles included in this section are intended to supplement the extensive reviews included in the above literature.

ANDERSON, Jonathan. A technique for measuring reading comprehension and readability. *English Language Teaching*. 25, 2. London 1971. p. 178-82.

Anderson justifies cloze procedure as a measure of both reading comprehension and readability. The number of words a subject replaces correctly is an index of his comprehension of the passage, and of the reading difficulty of the passage for that reader. Cloze procedure is suitable as a measure of reading comprehension for non-native readers of the language.

ONHMACHT, F.W. and FLEMING, J.T. Cloze and closure: a second analysis. Paper presented at the National Reading Conference. Tampa. Fla. December, 1971. ERIC. ED. 058 015

Results of studies of the relationship of flexibility and speed of closure were compared with results on structional, lexical and concrete and abstract cloze deletions in this study with 113 high school and 92 college subjects. Tests of associational fluency and verbal comprehension were also administered. Factor analysis showed that a cloze factor, perceptual factor and a verbal ability factor were involved. There was a marked difference of subjects at the different age levels, supporting the differentiation hypothesis that cloze procedure should vary in difficulty from one age level to another.

JONGSMA, E.R. *The Cloze Procedure: A Survey of the Research*. Indiana University. Bloomington. 1971. ERIC. ED. 050 893

Jongsma surveys cloze procedure in three areas; methodological consideration, cloze for measuring comprehension and readability, and cloze as a teaching technique. Evidence indicates that cloze procedure by an every Nth deletion system correlates better with standardised achievement tests than modified selective cloze procedure, that exact-word scoring is as reliable and valid as, and easier and quicker than, alternative methods of scoring; and that cloze procedure is a reliable

and valid measure of reading comprehension. Cloze procedure has made the greatest contribution to readability research and the study of language.

ROBINSON, R.D. *An Introduction to the Cloze Procedure.* An annotated bibliography. IRA. Delaware, 1972.

Thirty four cloze procedure studies are annotated under these headings: general references; methodoiogy of cioze contruction; use of cloze as a measure of readability; and use of cloze as a teaching strategy. Articles were selected on the basis of their importance and usefulness to research, and their implications for practitioners. The general reference section provides an extensive review of studies in cloze procedure up to 1970.

SCHELL, L.M. Promising possibilities for improving comprehension. *Journal of Reading,* Vol. 15, No. 6, March, 1972.

The author suggests possible ways of utilizing cloze procedure for improving reading comprehension. Suggestions include cloze exercises with lexical deletions, offering two items to choose from to complete the sentence at a level below the subjects' independent reading level, extended to deletion of function word items; increasing the choices of answer; and finally eliminating alternative answers. Discussion of the suitability of responses is recommended, as is acceptance of synonyms. Self-checking of responses for immediate feedback is also stressed. No evidence was given in this paper for any these methods, which are presented as possible teaching techniques.

TUINMAN, J.J. and BLANTON, B.E. The cloze procedure: corollaries of a search hypothesis. Indiana University, February, 1971. ERIC. ED. 047 913

A general search hypothesis that the process underlying cloze response is a systematic and exhaustive search was investigated with 390 Junior High School subjects. It was assumed that subjects would respond with some sensible responses and also some nonsense responses. Five versions of a three hundred word passage with every fifth word deleted were administered. The distribution of responses was related to success probability, and the ratio of sensible to nonsense responses was related to that distribution, sustaining the search hypothesis and indicating that the search process is systematic in part.

Methodology and Rationale of Cloze Procedure

Numerous studies have dealt with the construction, length of test, number, length and type of deletions, and scoring of cloze exercises. Both standard cloze procedure, that is, deletion of words at random or by every Nth procedure, and modified cloze procedure, deletion of words according to their word class, have been utilized. Scoring by restricting credit to exact words and giving full or partial credit for acceptable alternative responses has been examined. Many of these studies have been reviewd in Robinson, Jongsma and elsewhere. This section includes recent studies on aspects of cloze methodology and the use of context in reading comprehension.

AULLS, M.W. Towards a systematic approach to how the reader uses context to determine meaning. *Twentieth Journal of the National Reading Conference*. Delaware, 1971.

Psycholinguistic research show these constraints in how the reader uses context to determine meaning; position of the words in the sentence, the bilateral distribution of the text, the grammatical class form, the word frequency and syntactic variables. Readers use context to decode in units of speech and print.

BOWERS, F. and NACKE, P.L. Cloze, transformational theory and redundancy. *Journal of Reading Behaviour*, Vol. 4, No. 1. Winter 1971-2.

This study theorises that fast readers reject words and groups of words that are redundant, that is, that carry no information. Linguistic redundancy involves surface syntactic structure (morphemes, determiners. etc.) deep syntactic structure (carrying meaning) and semantic structure (interaction etc.). In view of the generative transformational theory of language, random cloze deletions must be modified to allow for the differences between structural and referential morphemes.

BRADLEY, M. Effects on reading tests of deletions of selected grammatical categories. *Nineteenth Yearbook of National Reading Conference*. Wisconsin. 1970.

This study supports the view that reading comprehension tests measure more than reading, they measure past learning, word association, and awareness of information constraints. In this investigation with 180 third. fourth and fifth grade pupils different forms of deletion were made. deletion of nouns, adjectives, main verbs, function words, no

words and all words, followed by multiple choice questions. Those with all words deleted - that is, those who did not read the passage, answered the questions correctly at a level significantly higher than chance. Those with adjectives and nouns deleted scored less than those who read the complete passage, and grammatical word-class deletions did have different effects on the reading passage.

CRANNEY, A.C. The construction of two types of cloze reading tests for college students. *Journal of Reading Behaviour*. Vol. 5, No. 1., Winter 1972-3, p. 60-64.

The author investigated whether valid and reliable cloze tests can be scored by machine without reliability and validity being impaired, and whether the reliability and validity of cloze tests can be improved by elimination of less effective cloze items. Six passages of 1500 words were selected from college texts of literature, social studies and science, all rated similarly on the Flesch readability scale. Two cloze tests of 300 items were constructed for each, the first with every tenth word deleted, and the second offering four choices for each deletion. The words from which selection was made were the most frequent responses of 120 subjects. Four hundred subjects completed the test, exact-word scoring being used. The 135 items answered best were selected. Another hundred subjects completed the tests which were marked separately on the best 135 items and on all the items. Machine scoring correlated satisfactorily with results on a standardised test, but free responses were more reliable than multiple choice responses. Elimination of less efficient items diminished reliability and validity. This finding disagrees with that of Greene (1964) which showed that rationally constructed cloze tests were superior in reliability and item performance to conventional cloze tests.

FAGAN, W.T. Transformations and comprehension. *Reading Teacher*. Vol. 25, No. 2. November, 1971.

Five transformations (embedding, conjoining, deletion, simple negative and positive shift) were investigated with fourth grade readers. The most difficult transformations seemed to be -ing nominalisations, genitives, deletions and negatives. Stories were written in four forms each with transformations. A third of the subjects studied different grammatical forms. Results of the cloze tests suggest that the more subjects know of the structure of what they read the better their comprehension.

McLEOD, J. and ANDERSON, J. An approach to assessment of reading ability through information transmission. *Journal of Reading Behaviour*. Vol. 2, No. 2, Spring 1969-70. p. 116-141.

The authors used 14 passages of 100 words, deleting one word in eight, selecting words for deletion on which 90% of subjects gave the same response. These were presented to subjects and scored to give an Uncertainty Reduction Index (U.R.I.) from which valid comparisions of the amount of information transmitted could be made. The U.R.I. scores showed almost perfect correlation with raw scores.

PORTNOY, S. A comparison of oral and written verbal behaviour. Unpublished doctoral dissertation. Columbia University. 1972.

Twenty-two undergraduates spoke and wrote prose passages. These were made into cloze exercises by the deletion of every fifth word and presented to peers for cloze responses. Results indicated that those individuals who used short words are more comprehensible when speaking, that is, the passages they generated gained higher cloze scores than those passages containing longer words. Those who used long words when writing are more comprehensible to their peers than those using short words.

RENTEL, V.M. Form class and word length as indices of the difficulty of predicting cloze entries in a sample of continuous prose. Unpublished doctoral dissertation. University of Southern Carolina. 1969.

A cloze test of reading comprehension was the basis of this study of the difficulty of predicting four categories of words (Fries's Form Classes 1, 2, 3 & 4) at three levels of word length (2-4 letters, 5-8 letters, 9-16 letters). One hundred and fifty college students completed the cloze passage. Analysis indicated that increase in word length increased difficulty of prediction, but not uniformly with all word classes. Form class 3 words were significantly more difficult to predict than others. Of words over seven letters in length, length seemed the main source of difficulty. The author stressed that these findings applied to the subjects and passage difficulty of this study only, and cautioned against generalisations.

SWALM, J.E. Comparison of oral reading, silent reading and listening comprehension assessed by cloze. *Education*. April-May 1972. 92 (4), p. 111-115.

Oral reading, silent reading and listening comprehension were compared in this investigation with 108 subjects of grades two, three and four. A story was followed by cloze exercises with random 10% deletions, the cloze responses for listening and reading being taped. There was a tendency, not significant at the required level, for better readers to comprehend more when reading silently than listening. Average readers also read slightly better silently at grades three and

four. Second graders performed significantly better with oral reading. Below average students performed best on listening comprehension exercises, and worst on silent reading.

WEAVER, W.W. and KINGSTON, A.J. Oral and oral-written language measures with first grade pupils. *Twentieth Yearbook of the National Reading Conference*. Wisconsin. 1971. p. 219-226.

Oral cloze procedure was used to measure English language structure, with deletions of function words and context words. Simple oral-written cloze exercises were used to test the ability to reason by analogy. Class discussion of suitable cloze units followed each exercise. The subjects were 102 first graders. At this level oral and oral-written cloze procedure was a suitable measure of language structure.

WEAVER, W.W., HOLMES, C.C. and REYNOLDS, R.J. The effect of reading variation and punctuation conditions upon reading comprehension. *Journal of Reading Behaviour*. Vol. 2, No. 1. Winter, 1969-70. p. 75-83.

Cloze procedure with twenty nouns deleted in each of four paragraphs was used to test oral reading, punctuated; oral reading, unpunctuated; silent reading, punctuated; and silent reading, unpunctuated. Silent reading gave higher cloze scores and lower total reading time Punctuated passages gained higher scores than unpunctuated.

WEAVER, W.W., KINGSTON, A.J. and DENNEN, J.A. Vertical and horizontal constraints in the context of reading of sentences. *Journal of Reading Behaviour*. 3. 1970.

The authors investigated the effect of horizontal constraints, such as word class, and vertical constraints, the distribution of words than can occur at a particular word class deletion, on cloze responses. Forty subjects supplied all the suitable words for ten content word deletions. Results indicated that both constraints are important in the context reading of sentences.

WHITE, W.F. and ACRON, R. Non-Verbal cues as determinants of reading comprehension. *Journal of Reading Behaviour*. Vol. 1, No. 4. Winter 1968-69.

Three classes of disadvantaged Negro fifth graders were presented with a story, group A reading the story only; Group B reading the story and examining a picture of the white antagonist and Negro protagonist; Group C reading the story and examining several pictures of the white antagonist and Negro protagonist. All were asked to rate the main characters. A cloze test of 60 deletions followed. The group which had just read the story gained a better idea of the main characters than the other group; Group B showed a better use of language in the cloze tests, credit being given for verbatim, synonym and generally acceptable responses.

Cloze Procedure as a Measure of Readability

Readability or reading difficulty of material is traditionally assessed by readability or reading ease formulae, which grade material according to vocabulary, length of sentence, structure, and other variables. These formulae often give misleading results, particularly with 'difficult' prose, such as that of James Joyce. Cloze procedure has been studied as a viable alternative, taking into account not only syntactic, semantic, structural and redundant elements in the material, but also factors inherent in the reader himself. Investigations into a variety of material have been made, and comparisons of cloze procedure and accepted readability formulae generally favour cloze procedure.

ANDERSON, J. If the model fits: A model for readability. *The Australian Journal of Education*, Vol. 10, 1966. p. 164-170.

This article examines the factors involved in readability measurement. Vocabulary and sentence structure have long been regarded as important factors present in material, and studies have suggested they account for 50% of the variance underlying structural elements. Redundancy is another factor inherent in material. Other material factors include the author's manner, format, typography, and stylistic factors, although their influence is as yet indefinite. Subject factors inherent in the reader affect him - his intelligence, verbal aptitude, vision, health, social and emotional factors. The reader's interest, motivation and experiential background make reading easier or more difficult. The theory is posited that any passage has an indefinite number of readability levels, and that because factors within each subject vary from one occasion to another, the same passage has different readability levels for the same subject at different times.

ANDERSON, J. Cloze procedure as a measure of readability. *P.N.G. Journal of Education*, Vol. 6, 1969. p. 21-26.

Anderson justifies the use of cloze procedure as a measure of the readability of a passage for a particular reader. Cloze takes into account not only the factors (syntactic and semantic) inherent in the passage, but also the reader's ability, motivation, interest and familiarity with the topic. The methodology and rationale for cloze procedure are discussed, and guidelines given for the preparation of cloze readability tests in the classroom.

FROELICH, D.M. A comparison of two methods of assessing text book readability of selected college level Electronics textbooks. Unpublished doctoral dissertation. University of Missouri. 1970. ERIC. ED. 041 131

Cloze procedure and the Flesch Reading Ease Formula were applied to college level Electronics textbooks. The fifty eight subjects in Basic Electronics completed the cloze tests. Results were compared with the achievement levels in Electronics. The cloze tests indexed difficulty and identified readability levels more consistently with subjects' abilities than did the Flesch Reading Ease Formula, which could not be used to predict readability levels in this material.

FROESTE, V. Cloze readability versus the Dale-Chall formula. Paper presented to the International Reading Association. Atlantic City, New Jersey. April 1971. ERIC. ED. 051 975.

Cloze tests were prepared on twelve sixth-grade science textbooks which were also analysed by the Dale-Chall readability formula. The 366 sixth grade subjects also completed the Canadian Lorge-Thorndike IQ test and the Canadian Test of Basic Skills, Vocabulary and Comprehension. Results showed that cloze procedure is a much more reliable measure of the reading difficulty of these textbooks than the Dale-Chall Readability Formula.

HAFNER, L.E., GWALTREY, W., and ROBINSON, R. Reading in book-keeping, predictions and performance. *Journal of Reading.* Vol. 14, No. 8. May 1971.

Three types of cloze test, deletion of every fifth word, deletion of every fifth noun or verb, and inserting punctuation marks only were prepared. The every fifth word deletion correlated significantly with intelligence and achievement measures in book-keeping.

HATER, M.A. and KANE, R.B. The cloze procedure as a measure of the reading comprehension and difficulty of mathematical English. Purdue University, 1970. ERIC. ED. 040 881.

Cloze procedure cannot be readily applied to Mathematical English, as deletion of mathematical symbols would greatly increase difficulty, and also because mathematical English does not have the same definite ordering of words. Deletions of words from mathematical English passages were made for a cloze exercise for subjects from grades seven to twelve. It was indicated that cloze tests were valid predictors of success, valid measures of the comprehensibility of mathematical English and could be used to predict reading difficulty.

HOUSKA, J. T. The efficacy of the cloze procedure as a readability tool on technical content material as used in industrial education at the high school level. Unpublished doctoral dissertation. University of Illinois at Urbana-Champaign. 1972.

Cloze procedure was used on technical material, and identified reading difficulty levels similar to the Flesch formula. Cloze also dis-

criminated between the varying reading ability of the high school subjects, and also related positively, with low correlations, to standardized measures of students' abilities and to I.Q.

KULM, G. Measuring the readability of elementary algebra using the cloze technique. Paper presented at the annual meeting of the American Educational Research Association. New York. February 1971. ERIC. ED. 047 972

Readability was investigated with two forms of cloze procedure on explanatory material and illustrative material. In explanatory material sentence length, the percentage of mathematical symbols and the percentage of difficult words had significant linear correlations with readability. In illustrative material the percentage of mathematical symbols and mathematical vocabulary had significant linear correlations with readability.

MOYLE, D. Readability - the use of cloze procedure. *Reading and the Curriculum.* (ed. John Merritt.) Proceedings of 7th Annual Study Conference of U.K. Reading Association. Ward Lock Intl. 1970.

Cloze procedure includes accuracy of vocabulary, fluency, knowledge of grammatical structure and understanding of the text so is a measure of total readability. The author suggests one word in five deleted is discriminating for adults, and suggests one word in ten for young children. He reports a pilot study on Griffin and Dragon books 1-6 by McCullogh and Arnold, where Fry's readability formula and cloze graded them for difficulty. Cloze procedure was a more discriminating measure of difficulty.

PETERSON, J. and others. Validation of the cloze procedure as a measure of readability with high school, trade school and college populations. Paper presented at the National Reading Conference, Tampa, Fla. December 1971. ERIC. ED. 058 000

The authors examined the applicability of Bormuth's cloze scores identifying the instructional reading level for readers in the intermediate grades to adult readers. Ninety two eleventh graders and eighty four post-secondary school subjects completed a standardised reading test and a cloze passage on health education. The high school subjects scored higher than post school subjects, but the total population performed within the limits of Bormuth's criteria, which can thus be used to assess instructional reading levels for adults.

RANKIN, E.F. Grade level interpretation of cloze readability scores. *Twentieth Yearbook of the National Reading Conference.* Wisconsin. 1970. p. 30-37.

This study investigated cloze procedure with every fifth word

deleted with Bormuth's readability grade of 44% and the Fry and Dale-Chall Readability Formulae. Significant correspondence was found with small numbers of readers from grades four, five and six, whose reading level had been assessed by the Paragraph Meaning Subtest of the Stanford Reading Achievement Test.

RANKIN, E.F. How flexibly do we read? *Journal of Reading Behaviour*. 3.3. Summer 1970-71, p. 34-38.

Cloze procedure was used to assess readability in passages of 100 words. Subjects, college freshmen, were instructed to read rapidly and underline the last word read every fifteen seconds. A flexibility coefficient was developed between the reading rate and cloze readability score. The Diagnostic Reading Test, Survey Section, was used as material in this one-semester course. Flexibility increased with training.

STEPHENS, R.G. Use of the cloze procedure as a criterion for evaluating the applicability of selected readability formulas to science reading materials. Unpublished doctoral dissertation. Indiana State University. 1972.

Cloze procedure was compared to the Dale-Chall, revised Dale-Chall and Fry readability formulas in this study with elementary science texts. Cloze tests at, above, and below grade level were prepared with every fifth word deleted for pupils in grades 4, 5 and 6. Results indicated that cloze procedure was the best discriminator of reading difficulty at the grade levels investigated in this study, with the Dale-Chall formula proving superior to the Fry Readability formula.

TURNER, B. and GILLILAND, J. The use of cloze procedure in the measurement of Schools Council Humanities Project Materials. *Reading*. Vol. 6, No. 2. June 1972.

The Schools Council Humanities Project materials are designed for average and below average readers of fourteen to sixteen years. This study used cloze procedure to assess the readability of the material for these students. Passages assessed as easy, medium and difficult, each 200 words long, were selected from "The Family" pack and every seventh word deleted to a total of 20 words in each. Students completed these ranked passages and marked them as easy, medium or difficult. Verbatim scores gained one mark; synonyms half a mark, but counting synonyms made little difference to the scores. The cloze scores discriminated between passages in terms of difficulty and pupils in terms of ability. The cloze scores indicated that much of the material of the Humanities Project is too difficult for the pupils, using Bormuth's criteria for cloze scores compared to multiple choice comprenhension scores.

Cloze Procedure as a Criterion to establish Readability Levels.

Multiple choice comprehension scores for reading comprehension and word recognition limit the three levels of readability distinguished by Betts (1946) in the Informal Reading Inventory as Independent level, at which the reader can read satisfactorily without help, 90% - 100%; the Instructional level, at which he can read satisfactorily with help; 75% - 90%; and the Frustration level at which he reads poorly, below 75%. Bormuth (1967) computed cloze scores to match these as Independent, 50%+; Instructional 38% - 50% and Frustration below 38%. These studies examine other criteria to establish readability levels.

ALEXANDER, H.W. An investigation of the cloze procedure as a measuring device designed to identify the independent instruction and frustration reading levels of pupils in the intermediate grades. Unpublished doctoral dissertation. University of Illinois. 1968.

As standardized reading tests are not effective and the informal reading inventory must be administered individually to determine students' independent instruction and frustration reading levels, cloze was investigated as a suitable group measure. Seventeen passages from *The New Basic Readers: Curriculum Foundation Series* (1968), difficulty level grade 1.6 to 9.9 were used for the cloze tests and an informal reading inventory, and subjects, 365 intermediate students, also took the Lorge-Thorndike Intelligence Test and Gates-MacGinitie Reading Test. Cloze scores below 47% identified frustration level, 47% - 61% the instruction level and over 61% the independent reading level for pupils in the intermediate grades.

GUSZAK, F.J. A comparative study of the validity of the cloze test and Metropolitan Achievement Test (reading comprehension subtest) for making judgements of Instructional levels. Unpublished doctoral dissertation. Texas University. Austin 1969. ERIC. ED. 039 108.

The Botel Reading Inventory Form A (word opposites) was used as the criterion for the Instructional level of reading. Three cloze tests, at below, at, and above grade levels four, five and six were prepared. The subjects took the Botel Metropolitan Achievement Test (reading comprehension) and the three cloze tests for the appropriate grade. No significant relationship was found between the cloze tests and the Metropolitan Achievement Test.

HODGES, E.J. A comparison of the functional reading levels of selected third grade subjects of varying reading abilities. Unpublished doctoral dissertation. University of Northern Colorado. 1972.

A hundred third graders completed the Informal Reading Inventory, Gates-MacGinitie Reading Test Survey C, Form I, Peabody Picture Vocabulary Test Form A (IQ), Houghton-Mifflin Pupil Placement Tests and cloze tests. Subjects were considered in four sub-groups, forty three developmental readers, thirty remedial readers, eleven corrective readers and sixteen adapted readers. The corrective and adapted readers were the only sub-groups which gained mean instructional reading levels on cloze tests and the informal reading inventory which were not significantly different.

SAUER, F.M. The determination of reading instructional level of disabled fourth grade readers utilizing cloze testing procedure. Unpublished doctoral dissertation. Oklahoma State University. 1969.

Cloze was examined to determine the instructional level of fourth grade disabled readers. Passages were prepared of 200 words at the 2.0, 2.5 and 3.0 readability levels assessed by the Spache formula. Subjects whose Standard Reading Inventory test scores placed them in the instructional grade level range 1.5 to 3.9 took the tests. Analysis of the cloze results indicated that cloze was not a valid determiner of the instructional level of reading of these students. However, analysis of specific types of incorrect responses would give guidelines for reading comprehension instruction for disabled readers at this level.

WEICHELMAN, D.S. A comparison of cloze procedure scores and informal inventory results for estimating functional reading levels for students at eighth grade level. Unpublished doctoral dissertation. University of Northern Colorado. 1971.

Seventy one eighth grade students were used in this study comparing the functional reading levels obtained with cloze, the Informal Reading Inventory (I.R.I.) and the Durrell Listening-Reading Test. Conclusions were that there was a positive relationship between functional reading levels identified by cloze and by I.R.I. Cloze tests gave greater variability than I.R.I. with individual students. Cloze tests identified students instructional reading levels more accurately than did the Durrell Listening-Reading Test.

Cloze Procedure as a Predictor of Achievement.

Some of the studies in other sections have involved cloze procedure as a predictor of achievement. This article and dissertation deal with cloze procedure as a predictor of grade-point average and reading group placement.

MASSOGLIA, E.T. Cloze procedure as a predictor of course grade-point average of graduate students enrolled in a course in adult education. Unpublished doctoral dissertation. North Carolina State University at Raleigh. 1972.

Cloze procedure was compared to a generic reading test (the Nelson-Denny Reading Test, cut-time administration for adults) as a predictor of course grade point average. Two cloze tests with different deletion patterns were prepared from material from class texts. Also investigated was clozin, cloze information, a term coined by the researcher to describe the sequence of events in the investigation. Results indicated that the pretest cloze was the best predictor of course grade point average, and also correlated significantly with the Nelson-Denny composite score. Knowledge gain, identified as the difference between pre and post test cloze, was present in tests based on the same passages, but with a different deletion pattern.

SCHOELLES, I.S. Cloze as a predictor of reading group placement. Paper presented to the International Reading Association. Atlantic City. April 1971.

The Stanford Achievement test and basal readers with cloze procedure applied were used in this investigation of cloze procedure with the individual reading ability of 470 subjects of grades one to five. It was indicated that more difficult material for cloze tests gave a greater dispersion of scores. Those guessing at random did not score well, credit being given for exact words and synonyms, so subjects must understand the passage to make an acceptable cloze response. Thus the use of cloze as a measure of understanding was reinforced. It was recommended that no time limit be imposed on subjects at this level so slower readers are not handicapped.

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Cloze Procedure as a Teaching Technique

Variations of both regular and modified cloze procedure have been used as a teaching technique. The annotated bibligraphies of Jongsma and Robinson deal with studies of cloze as a teaching strategy up to 1971; this section lists more recent investigations, most of which are concerned with reading comprehension. Cloze could be implemented in the classroom, although these studies report varying success. Discussion of cloze items seems to be advisable when cloze procedure is used for teaching.

BLACKWELL, J.M. THOMPSON, R.A. and DZIUBIAN, C.D. An investigation into the effectiveness of the cloze procedure as a vocabulary teaching tool. *Journal of Reading Behaviour*. Vol. 4, No. 4. Fall, 1971-2.

Stanford Diagnostic Reading Tests Form W were used to assess the effectiveness of cloze procedure in teaching vocabulary to third and fourth grades. The experimental group completed cloze passages with every fifth word deleted twice a week for thirty minutes while the control group dramatised identical stories. No other vocabulary was taught. After five weeks the group completing cloze exercises showed significantly superior vocabulary gains, indicating that cloze may be effective for teaching vocabulary at this level.

BORTNICK, R. and LOPARDO, G.S. An instructional application of the cloze procedure. *Journal of Reading*. Vol. 16, No. 4. January 1973.

The authors suggest ways of using cloze procedure for contextual cues, word analysis, vocabulary development and knowledge of structure. Students learn to use the context before and after deletions from discussing the choice of a cloze response. This also helps them to understand structure, recognise redundancy and analyse words. Discussion of suitability of synonyms helps vocabulary development and awareness of semantic constraints. Cloze passages can also be used to show different styles of writing.

BURNHAM, B.W. Use of the cloze procedure to increase mathematical facility. Unpublished doctoral dissertation. Arizona State University. 1973.

This study investigated cloze procedure as a means of improving the mathematical reading ability and mathematical facility of introductory college algebra students. Four classes were given weekly cloze procedure exercises over written mathematical English for eleven weeks, the cloze exercise dealing with the mathematical material being taught each week in algebra classes. The experimental group gained significantly higher scores than the control group (4 classes) on reading mathematical English, but there seemed to be no effect on observed mathematical facility. The skill gained seemed specific to written mathematical English.

CHARLES, E. An investigation of the use of cloze tests to compare gain scores of students in science who have used individualized science materials and those who have used traditional textbook materials. Unpublished doctoral dissertation. Lehigh University. 1970.

Cloze tests constructed from science material were used to compare the progress of students who had been taught by two different methods, using individualized science material and traditional textbook material. The subjects were junior high school students. Cloze procedure was sufficiently sensitive to index the gain in student scores from the different methods of learning.

DAUGHERTY, J. The effect of the cloze procedure and interspersed questions as an aid to reading comprehension. Unpublished doctoral dissertation. University of Akron. 1971.

A group of fourth grade pupils completed cloze passages and then completed multiple choice questions on the passage, another group read the passage with interspersed questions to elicit the main ideas, and completed multiple choice questions, while a third group read the passage without interruption and answered the same questions. Neither of the experimental groups scored significantly differently from the control group, so it was concluded that neither cloze procedure nor interspersed questions aided comprehension on these passages.

DUBOIS, R.L. A comparison of two approaches for the improvement of textbook comprehension in college reading classes. *Journal of Reading*. Vol. 14, No. 1. October, 1970. p. 10.

Cloze procedure was applied to passages from textbooks in science, English literature, and social science, and given to the experimental class, while the control class studied general reading materials.

Results indicated that reading instruction in general reading material was just as effective as instruction on subject matter material.

ELLINGTON, B.J. Evaluation of the cloze procedure as a teaching device for improving reading comprehension. Unpublished doctoral dissertation. University of Georgia. 1972.

This study evaluated the effect of cloze procedure in the development of comprehension, vocabulary and speed of reading by comparing scores on the Co-operative English Tests: Reading comprehension of eleventh grade students randomly grouped to receive cloze reading comprehension exercises, conventional reading comprehension exercises and no reading comprehension exercises. The cloze group completed 75 cloze exercise with every tenth word deleted from SRA Power Builders grades 8-12, the conventional group 75 exercises from SRA Lab IIIa Power Builders; and the control group regular English instruction. After 55 minutes daily instruction for six weeks, data revealed no significant differences among the three groups.

FAUBIAN, N.N. The effect of training in the use of cloze on the ability of fourth grade pupils to gain information from written discourse. Unpublished doctoral dissertatin. Texas A and M University. 1972.

Fourth graders trained for ten lessons, completing two cloze exercises of 100 words taken from Social Studies textbooks. Half of the cloze exercises were every fifth world deletion, half were structure word deletions. Responses were verbalized for half the samples. Results on the Stanford Reading Achievement Test Form W indicated that none of the groups, using cloze procedure or not, verbalizing responses or not, with structure words or any-word deletions, made significantly different gains. Other variables were hypothesised to affect cloze training at this level.

GUSCOTT, C.E. The effect of cloze procedure exercises on the improvement of reading achievement and of reading comprehension of selected sixth grade students. Unpublished doctoral dissertation. University of Akron. 1971.

Cloze procedure was investigated in a study of improving reading comprehension with sixth grade readers. Cloze exercises involving noun determiner deletions were completed by the experimental group. Results indicated that there was little difference in reading comprehension as a result of the cloze exercises.

KENNEDY, D.K. Training with the cloze procedure, visually and auditorially, to improve the reading and listening comprehension of third grade underachieving readers. Unpublished doctoral dissertation. Pennsylvania State University. 1972.

Four groups of underachieving third grade readers with the same mean reading age were involved in this investigation, one involved in cloze reading silently, one cloze listening, one class oral reading, and the other a control group. Results on a post-experimental test showed that those who had used cloze (visually and auditorially) scored higher than the control groups, so attending to contextual clues had proved beneficial. The groups using cloze also gained superior scores on the reading comprehension and listening sub-sections of the Durrell-Listening- Reading Series, Intermediate level.

RYNDERS, P. Use of the cloze procedure to develop comprehension skills in the intermediate grades. Unpublished doctoral dissertation. Syracuse. 1971 ERIC. ED. 071 020

This investigation assessed the use of cloze procedure to develop comprehension skills of 189 sixth graders over a five weeks period. The Iowa Test of Basic Skills was used to group students into small matched groups, and the Gates-MacGinitie Reading Test was used both pre- and post-experiment to estimate progress. The experimental groups used mutilated cloze passages, the control group used the same passages with multiple choice comprehension questions. Both groups discussed responses, but this did not help growth in reading comprehension. Both control and experimental groups made mean gains on the Gates-MacGinitie Reading Test of six months so cloze was not significantly different from traditional reading methods.

STEWART, E.W. A comparative study of the effectiveness of cloze and textbook procedures in the college reading program. *Journal of Reading*. Vol. 13, No. 1. October 1969.

Of eighty nine graduates enrolled in English-Mathematics courses, forty five used cloze procedure and forty four the conventional method. It had been hypothesised that the cloze group would experience more growth. However, this was not proven, and both cloze and textbook procedures showed the same progress.

Cloze Procedure in English as a non-native Language

Several recent studies have investigated cloze procedure as a measure of readability and reading comprehension of English learned as a non-native language. Cloze procedure has also been used as a teaching technique, and as a measure of listening comprehension with groups as diverse in background as Asians, Papua New Guineans and American Indians. Cloze appears to have potential as an inter-cultural measure of language proficiency with non-native speakers of English.

ANDERSON, Jonathan. The application of cloze procedure to English learned as a foreign language in Papua New Guinea. *English Language Teaching*. London. 1972. 27, 1. p. 66-72.

Cloze procedure as a measure of reading comprenhension and readability was tested in primary schools in Port Moresby. Cloze passages were ranked for difficulty by experienced teachers of English as a foreign language in Papua New Guinea. Subjects' scores on the cloze passages ranked them in the same order as the teachers. Cloze discriminated adequately between the subjects. Different scoring procedures were used, credit being given for exact words (verbatim), synonyms, acceptable alternative responses, and responses of the same grammatical class as the item deleted, but final scores on all methods differed little, so verbatim scoring, which was quick, objective, reliable and easier than the other method, was considered preferable.

ANDERSON, J. Research on Comprehension in Reading. In Bracken, D.K. & D. Meimquist, ed. *Improving Reading Ability around the World*. 3rd I.R.A. World Congress on Reading. 1970. Newark, Delaware.

Anderson compared the use of standard length blanks and exact length blanks, with answers written in a column on an answer sheet and in the margin, in cloze exercises. Subjects were 110 Papua New Guinea pupils, standards 4, 5 and 6, working in English, the foreign language used for education. Exact length blanks and standard length blanks were used in two versions of the cloze tests. Subjects also took Watts Sentence test. Scores of both versions of the cloze test correlated significantly with scores on Watts Sentence test, the exact-length blank scores being slightly not significantly, better. Using exact-word blanks, covering or masking the word to be deleted and photocopying, has the advantages of keeping the size of print, illustrative material and page layout incorporated into the cloze estimate of readability.

CRAKER, H.U. Clozentropy procedure as an instrument for measuring oral English competencies of first grade children. Unpublished doctoral dissertation. University of New Mexico. 1971.

This study investigated cloze procedure as an instrument for differentiating between achievement levels of first grade children. Anglo, Spanish, Negro and Narejo children were involved, in four different groups. Cloze was used orally, material taken from first grade readers.

Results indicated that the groups achieved in this order; Anglo, Spanish, Negro and Narejo, which was the same as indicated by other measures. Oral clozentropy procedure differentiated between groups and individuals when used with preliterates.

CRAWFORD, A.N. The cloze procedure as a measure of the reading comprehension of elementary level Mexican-American and Anglo-American children. Unpublished doctoral dissertation. U.C.L.A. 1970.

This study investigated the validity, reliability and appropriateness of cloze tests for measuring the reading comprehension of third and sixth grade Anglo-American and Mexican-American children whose dominant home language was Spanish. There were thirty subjects in each language group, classified as more able and less able readers. A cloze test at second grade level and the Stanford Achievement Test Primary II, Form Y was administered to all third graders and a cloze test at fourth grade level and the reading subtests of the Comprehensive Tests of Basic Skills Level 2 Form Q to all sixth grade subjects. Selected subjects took the Gilmore Oral Reading Test, Form C at both grade levels. Additional cloze tests from grade levels one to seven established the instructional reading levels determined by cloze as corresponding closely with those determined by other measures. Correlations of cloze and standardised tests indicated that cloze tests were valid and reliable measures in each group with both less and more able readers from these groups of Spanish and English speaking Mexican and Anglo-American children.

DARNELL, D.K. Clozentropy: a procedure for testing English language proficiency of foreign students. ERIC. ED. 024 039. 1968.

Clozentropy is a term coined by the author to name a combination of cloze procedure and an entropy measure from information theory. Clozentropy measures the extent to which cloze responses coincide with the most frequent response to a cloze item. Clozentropy tests from both engineering and liberal arts material and the Test of English as a Foreign Language (TOEFL) were administered to 48 foreign students; 200 native English speakers completing the clozentropy test to get frequency of response. The clozentropy and TOEFL proved reliable. From analysis of variance it was claimed that clozentropy is an objective measure of communication, adaptable to the needs of specialised groups and specialised uses of language.

ESTRADA, F.X. The effect of increasing syntactic complexity on reading comprehension. Unpublished master's thesis. University of Southern California. 1969.

This study examined the relationship between the degree of comprehension with which written passages are read and the syntactic complexity of the sentences. Two cloze passages at three levels equated in difficulty by controlling variables of vocabulary, length of word and

sentence and subject matter were prepared. The first level had main clauses only, the second level main and dependent clauses, the third level main and embedded reduced dependent clauses. Seventy five fourth graders, Navajo Indians and native English speakers were subjects. Results indicated that reading comprehension is a function of the degree of complexity of sentence structure. Indian students scored significantly lower on the more complex structures, than native Englisn speakers, which is evidence that they cannot supply from their knowledge of the language the experience on which to base guesses as to what is omitted.

GREGORY-PANOPOULOS, J.F. An experimental application of "cloze" procedure as a diagnostic test of listening comprehension among foreign students. Unpublished doctoral dissertation, University of Southern California. 1966.

The Brown-Carlsen Listening Comprehension Test Form BM and Califonia Reading Test, Advanced, Form Y were used as external criteria in this study of the effectiveness of an every fifth deletion cloze passage with taped noise substituted for the omitted words. Subjects were college students. Results indicated that the reliability of the taped cloze test was significantly higher than that of the Brown-Carlsen test or the California Reading test. Correlations between cloze tests and these tests were moderately high. Mean scores improved significantly between test and retest. Cloze seemed a valid and reliable measure of listening comprehension of these subjects at this level.

HUMPHREYS, J. and KEY, R. The use of cloze techniques to grade texts in the "Pacific Horizons" reading scheme. *P.N.G. Journal of Education*. Vol. 7, No. 2, June 1971. p. 5-8.

Reading materials were prepared and graded by P.N.G. primary school teachers, and regraded using cloze procedure and a mathematical formula provided by Dr. J. Anderson to attempt to gain greater accuracy in grading. Two classes of 35 pupils from each of standard six and form one were subjects. Anderson's Cloze Reading Test and up to 20 texts converted to cloze by deletion of every eighth word were randomly allocated to each class. Analysis of results showed that while correlations were close to previous gradings, anomolies occured at all levels. Factors affecting cloze scores included the style of writing, the interest value, and whether the story contained material that conflicted with the children's beliefs. Level of difficuly fell if the story was set in familiar situations, if it aroused the children's interests, and if the text was written by teachers familiar with the children's strengths and weakness. Cloze could thus provide a precise measure for readability.

HUNT, A.H. Factor validity of cloze tests of reading comprehension of English learned as a foreign language. Unpublished essay. University of New England. 1969.

Matching reading material to the abilities of the readers is a

major educational problem compounded when reading material is in a foreign language. Cloze procedure seems a likely technique for accomplishing this, so this study endeavoured to established the factor validity of cloze tests for Papua New Guinean students for whom English is a foreign language. 284 elementary school pupils of standards 4, 5 and 6 completed cloze tests with every eighth word deleted. Multiple choice comprehension questions (MCCQ) were made over the same material to test vocabulary, knowledge of stated facts, grasp of organisation, perceiving causality, identifying the main theme and making inferences. A scatter plot demonstrated that the regression of cloze scores on MCCQ scores was linear and bivarite, and the distribution was homoscedastic. One factor accounted for 63% of the variance in the matrix, a factor called "reading comprehension". This study supported those of Bormuth (1966) and Anderson (1969) that cloze procedure measures skills closely related to or identical to those measured by MCCQ tests.

KLARE, G. R., SINAIKO, H.W. and STOLUROW, L.M. *The Cloze Procedure: A Convenient Readability Test for Training Materials and Translations*. Institute for Defence Analyses, Science and Technology Division, Paper P. 660, Virgina. January 1971.

This paper discusses the characteristics, limitations and advantages of the cloze technique as a measure of readability and reading comprehension. An exploratory cloze test, grade 4 level, with deletions of every 5th, 8th, 11th and 14th word was administered to adults in a Basic Education course. On the cloze test with every fifth word deleted many blank spaces were left, suggesting that for low ability adults less frequent deletions are preferable. An every seventh word deletion was made on a cloze passage translated into Vietnamese from an English maintenance manual. A good and poor (subjectively assessed) translation of the passage was made in Vietnamese. Subjects (Vietnamese) also attempted a cloze test on the English version. Well educated Vietnamese performed better on the Vietnamese test. Cloze appears to have potential for assessing the readability of translations.

MASON, V. Report on cloze tests administered to Thai students. *Bulletin of the English Language Centre*. Vol. II, No. 1, 1972. Bangkok, p. 31-39.

Thai and English cloze passages were used in this study involving 122 Thai high school seniors (12th grade). One cloze passage was written in English, one written in Thai, the third translated from English to Thai, the fourth translated from Thai to English. 35 American high school seniors completed the English passages. Thai students took both an English and an unrelated Thai passage; each passage having every sixth word deleted up to 40 deletions. Scoring was both exact-word and giving credit for multiple-word responses. Performance of Thais and Americans on native language material was comparable

when multiple-word responses(in Thai) were allowed. Neither group performed as well on translated material, and Thai students' scores on English passages were less than half the scores on Thai passages. Students from two schools were used in the study, and there was a marked difference in subjects' scores on their English finals and the English prose passages. At one (Piboon) there was virtually no correlation, at Suwannararm correlations were better. At the latter school individual cloze scores correlated well with English finals results.

OLLER, J. W. Scoring methods and difficulty levels for cloze tests of proficiency in English as a second language. *Modern Languages Journal.* Vol. 56, March 1972, p. 151-157.

Oller experimented to determine whether exact-word scoring or contextually acceptable substitute scoring was a better method for marking cloze tests of proficiency in E.S.L. subjects. 398 students from 55 language backgrounds took UCLA E.S.L. PE Form 2A. Three cloze tests of 375 words with every 7th word deleted, were constructed, one easy, one low intermediate and one at advanced levels, and administered randomly. Each cloze test was differentiated by five responses; (1) exact word scoring (2) contextually acceptable responses (3) responses violating long-range constraints (4) responses violating short-range constraints and (5) incorrect or blank responses. Results showed method (2) was superior for E.S.L. students. Acceptable or alternative response scoring was superior in terms of item discrimination and in validating correlations regardless of the level of difficulty of the test. Of the traditional test types investigated, cloze correlates best with those requiring high level integrative skills.

OLLER, J.W., BOWEN, J.O., DIEN, T., and MASON, V.W. Cloze tests in English, Thai and Vietnamese: native and non-native performance. *Language Learning*, Vol. 22, No. 1, 1972.

Passages in Thai and Vietnamese were translated into English, and English passages translated into Thai and Vietnamese. 35 English, 122 Thai and 115 Vietnamese native speakers, completed cloze passages in their own language and English. Native speakers compared to non-native made almost no responses which violated all contextual constraints and speakers scored more highly in passages in their native language. Mean scores for native speakers on the originals and translations showed that such translation yielded cloze tests of approximately equal difficulty in both languages. Item analysis showed greater discrimination among non-native speakers who tended to make different types of errors from native speakers.

OLLER, J.W. and CONRAD, C.A. The cloze technique and E.S.L. proficiency. *Language Learning*. Vol. 21, No. 2, 1971, p. 183-195.

This paper reviews an experiment to attempt to determine the discriminative power of the cloze technique and its validity as a device for measuring E.S.L. skills using exact word scoring. Previous research is discussed. Students in beginning, intermediate and advanced E.S.L.

groups, and two groups of native English speakers were administered a cloze test of 50 blanks, every seventh word deleted over 350 words, and the UCLA E.S.L. PE Form 2C. Results showed the differentiation of levels of proficiency among E.S.L. students adequate, but the test failed to discriminate adequately between native speakers and advanced E.S.L. students. The tests differentiated between native language college entrants and graduates. Cloze results correlated best with traditional tests requiring a high level of integrative skills (dictation and reading on UCLA E.S.L. PE 2C). Cloze procedure is thus a promising device for measuring E.S.L. proficiency.

OLLER, J.W. and INAL, N. A cloze test of English prepositions. *Tesol Quarterly*. Vol. 5, 1971. p. 315-326.

Cloze procedure was investigated to measure the skill of non-native speakers in handling English prepositions. A cloze test of 50 deletions of every second preposition, including verb particles, was administered to 19 English speaking college entrants (Gp 1), 53 Turkish speakers studying science (Gp 2) and 110 students of 30 language backgrounds from 36 fields of study (Gp 3). UCLA E.S.L. PE Form 2B was used for validation. Scoring was on any acceptable word basis. Test item analysis and frequency analysis was computed for each group. Results showed cloze tests of prepositions were reliable for foreign students (Gps 2 and 3), differentiating best between subjects from a variety of backgrounds (Gp 3). A significant percentage of responses of Turkish speakers could be predicted by contrastive analysis based on translation equivalents. Considerable intra-linguistic confusion occured regardless of the language background of the students, and cloze technique indicated where some common difficulties lie.

SINAIKO, H.W. and KLARE, G.R. *Further Experiments in Language Translation: a Second Evaluation of the Readability of Computer Translations*. Institute for Defence Analyses, Science and Technology Division. Paper P-805. Virgina. December, 1971.

Maintenance manuals were translated from English to Vietnamese in three ways; a computer translation, an edited computer translation and a human translation. Cloze tests over 500 words for 141 Vietnamese and 57 United States subjects were made. Multiple choice tests followed the readings. The three versions were ranked in the same order by cloze and multiple choice comprehension tests, human, edited and unedited in that order. Vietnamese scored low on English versions of the test, scoring nearly twice as much on a second reading. Cloze proved a highly convenient and reliable test of the readability of translations, measuring the subtler aspects of language so that scores in a second language were low. Cloze may prove a useful measure of growth of skill in reading a foreign language.

CLOZE PROCEDURE IN LANGUAGES OTHER THAN ENGLISH

Cloze Procedure and Native Language Speakers

Although most cloze procedure research has been in English, some studies have investigated its application to other languages. These studies use cloze procedure as a measure of readability and reading comprehension in non-European languages.

ANDERSON, J. and RAHMAN, F. *A Feasibility Study of the Applicability of Cloze Procedure as a Measuring Device for Reading Comprehension in the Malay Language*. Ministry of Education, Singapore, N.R.C. No. 7. 1972.

Whether cloze procedure discriminates between the reading difficulty of a number of passages and the reading ability of pupils in the upper primary school in the Malay language was investigated. Five reading passages were chosen from Malay readers and ranked by language specialists and teachers. Every fifth word was deleted in each passage, there being five versions all beginning with a different deletion so all words were systematically deleted after leaving sufficient lead-in and lead-out. Pupils in nine Malay primary schools at level 4, 5 and 6 completed the cloze tests. Results indicated that cloze ranked the passages for difficulty the same as language specialists, and cloze scores for subjects correlated highly with scores on the school's final examinations. Cloze procedure discriminated between passages, and between subjects, and had high test-retest reliability. Cloze procedure seems a suitable measure of readability and reading comprehension in the Malay language.

LEONG, S.N. *Cloze Procedure as a Measuring Device for Reading Comprehension in the Chinese Language* Ministry of Education, Singapore N.R.C. No. 4. 1972.

This study examined if cloze procedure ranked passages in order of difficulty as did language teachers, discriminated between students and correlated significantly with student results in Chinese Language school examinations. Five passages of 80-90 words had every fifth word deleted, in five different versions, each beginning with a different word so every word was systematically deleted, after sufficient lead-in and lead-out to each passage. Results indicated that cloze discriminated between the passages and ranked them in the same order of difficulty as twenty six experienced teachers of the Chinese language. Cloze procedure discriminated between students, and cloze results correlated positive and significantly with Chinese

language examinations. Synonym scores correlated at 0.98 with exact word scores, so it was decided that exact word scoring was preferable. Cloze seemed as suitable as a measure of reading comprehension in Chinese as in European languages.

RUFENER, J.B. Use of the cloze procedure with Thai school children: an exploratory study of readability and individual differences in reading. Unpublished doctoral dissertation. University of Illinois at Urbana-Champaign. 1972.

Urban and rural Thai children, grades II to V, 151 boys and 142 girls were the subjects in this study of the applicability of cloze procedure to the Thai language. Raven's Progressive Matrices, class grades in reading and average academic grades were used as assessment measures. Passages from texts in use were selected from Grade level I to VI and multilated by an every fifth word deletion. Subjects completed cloze tests at their own grade level and the next level above and below. Exact word scoring was used. Results showed that cloze passages were ranked consistently among subjects, indicating that cloze assesses readability. Cloze scores increased with grade level and ability, indicating that cloze is sensitive to different reading ability. Cloze scores correlated positively with school achievement and scores on Raven's Progressive Matrices, indicating the validity of cloze tests for assessing Thai elementary school children.

SHIBA, S.S. A study of readability measurement - application of cloze procedure to Japanese language. *Japanese Journal of Psychology*. 28, 67-69, 135. 1957. (English Abstract.)

Cloze was investigated as a measure of readability of the Japanese language, which is totally unlike English. Results indicated that cloze procedure in Japanese measures the degree of likeness between the pattern of the writer and the reader's anticipation of it. Word deletion discriminated better than deletion of letters. Ten to fifteen percent deletion with 30 subjects was found to be sufficient to discriminate between reading difficulty of passages.

CARROLL, J.B., CARTON, A.S. and WILDS, C.D. An investigation of cloze items in the measurement of achievement in foreign languages. A report on research conducted under a grant from the College Entrance Examination Board, Cambridge, Mass. 1959.

The feasibility of using cloze procedure test items, words and letters, for written College Entrance Examinations foreign language tests was examined in this study. Trial cloze tests in English, French and German were completed by English-French and English-German bilingual adults, using both word and letter deletions. 205 secondary students of French and 63 of German then completed the cloze tests, and it was suggested that their scores be compared to those of the bilingual adults for a meaningful measure of performance. Word-cloze and letter-cloze scores did not correlate highly and seem to measure different aspects of second language proficiency. It was decided that cloze scores are possibly influenced by reasoning ability and ideational fluency, so are not recommended in college Entrance Examination Board foreign language tests.

KERR, A.H. Psycholinguistics and a new empirical approach to the measurement of comprehension and readability of French as a second language. In Simpkins & Miller (ed) *Changing Education*. McGraw-Hill. Sydney. 1972. p. 278-293.

Reasons for objective measures of comprehension and readability which allow for factors inherent in the reader are given, and the rationale for the psycholinguistic approach given. Studies using cloze procedure are cited, including the author's cloze test in French in Australian high schools. This test ranked passages the same as experienced French teachers, and correlated at 0.83 with multiple choice comprehension tests on the same reading passages and with the Cohen Silent Reading Test. From factor analysis of the French cloze and multiple choice questions one factor emerged which accounted for 61.06% of the variance. Cloze procedure seems to have the same potential advantages in French as in English.

Cloze Procedure and Other Studies

Investigations have been made involving cloze procedure in a variety of situations and with a variety of subjects. The studies in this section are selected as being recent and having relevance for practitioners involved in teaching and researching reading skills.

BRYNE, M.A., FELDHUSEN, J.F. and KANE, R.B. The relationship among two close measurement procedures and associational fluency. *Reading Research Quarterly*. Vol. 13. 1971.

This study attempted to determine the relationship between associational fluency and cloze performance, and whether cloze procedure could be modified to elicit more associational fluency.

Guilford's Associational Fluency Test, intelligence tests and two cloze tests, one regular and one adapted requiring multiple responses in each blank, were administered to 113 seventh graders. Analysis of results showed subjects who were high in associational fluency scored significantly higher on cloze than their peers. There was no significant interaction between fluency level and cloze form, as the adapted cloze form did not result in higher levels of cloze performance.

CARVER, R.P., JOHNSON, R.L. and FRIEDMAN, H.L. Factor analysis of the ability to comprehend time-compressed speech. *Journal of Reading Behaviour*. Vol. 4, No. 1. Winter 1971-2.

Individual differences in listening comprehension of speech at different rates was examined, using the Carver-Darby Chunked Reading Test in five variations. Cloze tests from the Miller-Coleman passages in order of readability were presented at different speeds also. The conclusions were that cloze comprehension tests mainly involve an ability or skill which is separate from but related to the ability to comprehend; and that comprehension of fast speech involves a perceptual ability which is field-independent and attends only to content.

GOODSTEIN, H.A. The performance of educable mentally handicapped and average IQ children on two modified cloze tasks for oral language. Unpublished doctoral dissertation. University of Connecticut, 1969.

A sample of educable mentally handicapped (E.M.H.) and average IQ children (A.I.Q.), matched for mental and reading age, were administered two cloze tests reflecting a production task (com-

pleting a four word sentence with one word deleted) and a recognition task (choosing an appropriate response from four given words to complete the sentence). E.M.H. children were significantly poorer than A.I.Q. children in cloze performance. The recognition task was significantly easier than the production task for all subjects. The results were interpreted as reflecting linguistic stimuli by E.M.H. children.

GUTHRIE, J.T. Motivational effects of feedback in reading. Unpublished doctoral dissertation. John Hopkins University. 1970.

Seventy two male college subjects read prose sentences and completed cloze items with delayed, immediate or omitted feedback. A cloze retention test was given immediately, delayed or omitted. Subjects could go on reading, which indicated their perseverance and motivation. Results indicated that with delayed feedback significantly more learning on the original task occured; with immediate feedback significantly more perseverance on the continuation passages was shown; and perseverance correlated positively with the cloze comprehension tests. Thus under different feedback conditions there are differential effective responses to the reading task.

HARGIS, C.H. Contextual use in reading performance as a function of type of material and level of intelligence. Unpublished dissertation. Kent State University, Ohio. August 1970. ERIC. ED. 059 022

Sixty mentally retarded and sixty normal children aged ten to twelve completed the Stanford Binet Test (for retardates) and California Test of Mental Maturity, and passages of 200 words with forty deletions, the passages from primer to ninth grade. Standard cloze procedure and a modified cloze with nonsense syllables inserted in place of deletions were used. The findings indicated that normal and retarded readers differ significantly in their ability to use contextual clues, retardates being handicapped in selecting acceptable synonyms from context. Comprehension scores on modified cloze procedure differed significantly from those on standard cloze passages. Neither overt nor covert use of context had any significant effect on reading comprehension.

HENRY, P.E. The effect of interest on reading comprehension as measured by cloze and multiple choice tests. Unpublished doctoral dissertation. University of Iowa. 1967.

Multiple choice comprehension tests and cloze tests were used

in this study of how interest affected reading comprehension. Two selections of similar readability, one appealing to boys and the other to girls, were given to 80 matched pairs of boys and 82 matched pairs of girls, to complete multiple choice tests. The mean score of girls was higher over the selection appealing to girls, and the mean score of boys on the selection appealing to boys, which suggests that readers' interest positively and significantly affected reading comprehension. Two of the cloze tests (one of interest to boys and one of interest to girls) of comparable readability were given to fourth and sixth graders, subjects stating a preference for one of the selections. For these subjects preference for a selection did not affect degree of comprehension when measured by cloze tests.

HOLMES, C.C. Specific effects of test anxiety on reading comprehension as measured by the cloze procedure. Unpublished doctoral dissertion. University of Georgia. 1972.

This study was designed to determine the effects of test anxiety level and "defensiveness" level on reading comprehension measured by cloze procedure. 253 fourth grade children were administered Sarason's Test Anxiety Scale for Children and the General Anxiety Scale for Children. 134 selected children then took a 40 item cloze reading test. Indications were that the cloze comprehension factor was unaffected by anxiety or defensiveness, whereas other testing methods (reading time, vocabulary and test times) were affected in inverse proportion to the subject's reading ability.

KIRCHHOFF, L.H. A study utilizing the cloze test procedure to determine reading levels of first grade children who have been taught beginning reading by four different approaches. Unpublished doctoral dissertation. Universty of Kansas. 1968.

A cloze test and an informal reading inventory were administered to first grade children who had been taught reading by four different approaches, Initial Teaching Alphabet, Sullivan Programmed Readings, Linguistics and Bessal. The 120 pupils also took an intelligence test and a silent reading test. The correlations between the cloze test scores and informal reading inventory scores at the instruction and frustration reading levels were statistically significant. Cloze is easy and quick to administer and interpret to groups, so could be utilized to determine the appropriate reading level for children in first grade.

LISMAN, L.C. Vowel deletion and cloze tests compared to a reading ability test. Unpublished master's dissertation. Rutgers State University, New Jersey. Oct. 1971. ERIC. ED. 054 894

The Wechsler Intelligence Scale for Children and the Gates MacGinitie Reading Test Survey E were compared to results on cloze tests with word and vowel deletions with 57 seventh and 60 eight graders from three ability groups. Correlations of results of the cloze test with vowel deletions were significant with the overall reading test and IQ measures. Eighth graders vowel deletion scores correlated higher with subtests in speed and vocabulary, and seventh graders with reading comprehension. Vowel deletion scores correlated as highly as word cloze correlations for the total population.

LYNCH, F.D. Clozentropy: a technique for studying audience response to films. Unpublished doctoral dissertation. University of Iowa. 1972.

The clozentropy procedure was applied to films, one simple and one complex. Of the 93 subjects, one third were "sophisticated" about films. The two films were shown with 26 interruptions and the subjects answered objective type questions to predict what would happen next, both plot predictions and shot-level predictions being made. Results indicated the technique can determine differences in complexity among films and differences in sophistication among viewers, so is useful for the empirical analysis of visual communication.

MARSHALL, W.J.A. 1970. Investigating the effect of contextual constraint on deaf and hearing children at the fourth grade reading level, using the cloze procedure. Unpublished doctoral dissertation. University of Illinois. 1970.

Cloze passages were multilated selectively to reduce grammatical and semantic cues in this study with deaf children. The cloze passages were completed by deaf and hearing children who read at the fourth grade level. Results indicated that the relative redundancy of the grammatical and semantic cues of the material affected grammatical competence as assessed by cloze scores. The effect of the selective multilation was greater with deaf than with hearing subjects.

POTTER, T.C. Reading comprehension among minority groups: child-generated instructional materials. 1968. ERIC. ED. 031 546.

It was hypothesised that stories created by a dialectical minority

subgroup may be more comprehensible to their peers than reading material in Standard English. Third grade negro children recorded stories about four pictures. Cloze exercises were made from these, and from Standard English stories in use in the classrooms. Of the 79 subjects taking the cloze tests, 70 scored higher on the child-generated passages. This suggests that peer-generated reading materials may be suitable for minority groups.

RAMANAUSKAS, S. The responsiveness of cloze readability measures to linguistic variables operating over segments of text longer than a sentence. *Reading Research Quarterly*. Vol. 8, No. 1. Fall 1972.

This study investigated the effect of linguistic constraints outside the sentence with fifty eight educable mental retardates with a mean mental age of ten. Cloze items on basal reader reading selections (at the 2.2 level) of 250 words with first and fifth word deletions were presented to subjects in small groups. One task involved the sentences in natural order, the other involved rearranged sentences, so that linguistic constraints within sentences were the same. Readability formulae assessed both tasks as equally readable. All students took both tasks in random order with a week apart, and all practised examples. Exact-word scoring was used. Students gained significantly better results on the task with sentences in natural order whether they had completed it first or second, so constraints between sentences affected reading comprehension.

RATEKIN, N.H. The adequacy of the cloze in measuring comprehension of different logical patterns. Paper presented at the National Reading Conference, Tampa, Fla. December 1971. ERIC. ED. 061 012.

Multiple choice comprehension tests and cloze procedure were constructed on inductive and deductive materal presented to thirty three college subjects, who also took the Logical Patterns tests. Deductively presented passages were significantly and consistently more difficult than inductively presented passages. The multiple choice comprehension tests seemed to discriminate between comprehension levels of both methods of presentation better than did the cloze tests.

SCHAEFFER, H.H. A vocabulary program using "language redundancy". January 1961. Pittsburgh University. ERIC. ED. 014 879.

This study investigated the hypothesis that redundant parts of

a sentence could be replaced with foreign or nonsense words without inhibiting comprehension, and that continued use of foreign words would help the reader to accept them and understand the grammatical structure of the foreign language. Non-German speaking subjects were given short stories to read with 350 German words replacing English words. The subjects could translate 60% of the German words afterwards, and also gained a basic knowledge of the grammatical structure.

SEMMELL, M.I. et al. *The Performance of Educable Mentally Retarded and Normal Children on a Modified Cloze Task.* Studies in Language and Language Behaviour, Progress Report 5, September 1967, Michigan University, Ann Arbor.

Responses of educable mental retardates and normal children were compared on cloze tasks involving deletions in different positions in the sentence to assess the extent to which the position of the deletion affected the response. Different sentence types and words of different grammatical form classes were used. Retardates did not perform as well as normal children on any cloze task except replacing the last word of a four-word sentence. The authors suggest that this indicates that retardates depend more on sequential than grammatical strategies in a cloze task.

SIKES, H.C. A comparative study of cloze procedure scores on original and published material. *Reading Teacher.* November 1971. Vol 25, No. 2, p. 207.

The author compared the cloze scores of fifth and sixth graders on stories written by their peers and published material put out by Science Research Associates. There was little difference in the subjects' scores on other children's stories and on published materials.

STUCKLESS, E.R. and ENDERS, M. Three studies of the structural meaning of English for post-secondary deaf students. January 1972. ERIC. ED. 060 60

Cloze procedure was used for language assessment and to test identification of structural units. While cloze indicated overall language proficiency, the technique was too general to assess indvidual linguistic ability of the deaf, and it was recommended that it be used as an adjunct to, not a replacement for, language skill assessment tests. It was suggested that cloze could be used as an instructional technique at the teachers' discretion.

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